



September 26, 2016

Meagan E. Ormand Golder Associates Inc. 2108 W. Laburnum Ave. Suite 200 Richmond, VA 23227

RE: Project: Bremo Monthly Process Pace Project No.: 92313181

# Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on September 21, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nicole Gasiorowski

Micolo Yasicronske

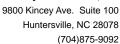
nicole.gasiorowski@pacelabs.com

**Project Manager** 

Enclosures

cc: Ron DiFrancesco, Golder Associates Inc. Martha Smith, Golder Associates Inc. Mike Williams, Golder Associates Inc







#### **CERTIFICATIONS**

Project: **Bremo Monthly Process** 

Pace Project No.: 92313181

**Ormond Beach Certification IDs** 

8 East Tower Circle, Ormond Beach, FL 32174

Alabama Certification #: 41320 Connecticut Certification #: PH-0216

Delaware Certification: FL NELAC Reciprocity

Florida Certification #: E83079 Georgia Certification #: 955

Guam Certification: FL NELAC Reciprocity Hawaii Certification: FL NELAC Reciprocity

Illinois Certification #: 200068

Indiana Certification: FL NELAC Reciprocity

Kansas Certification #: E-10383

Louisiana Certification #: FL NELAC Reciprocity

Louisiana Environmental Certificate #: 05007

Maryland Certification: #346 Michigan Certification #: 9911

Mississippi Certification: FL NELAC Reciprocity

Missouri Certification #: 236

Montana Certification #: Cert 0074

**Eden Certification IDs** 

205 East Meadow Road Suite A, Eden, NC 27288 North Carolina Drinking Water Certification #: 37738 Nebraska Certification: NE-OS-28-14

Nevada Certification: FL NELAC Reciprocity

New York Certification #: 11608

North Carolina Environmental Certificate #: 667

North Carolina Certification #: 12710 North Dakota Certification #: R-216 Oklahoma Certification #: D9947 Pennsylvania Certification #: 68-00547 Puerto Rico Certification #: FL01264 South Carolina Certification: #96042001 Tennessee Certification #: TN02974

Texas Certification: FL NELAC Reciprocity

US Virgin Islands Certification: FL NELAC Reciprocity Virginia Environmental Certification #: 460165

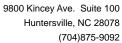
Wyoming Certification: FL NELAC Reciprocity

West Virginia Certification #: 9962C Wisconsin Certification #: 399079670

Wyoming (EPA Region 8): FL NELAC Reciprocity

North Carolina Wastewater Certification #: 633

Virginia/VELAP Certification #: 460025



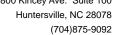


# **SAMPLE ANALYTE COUNT**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92313181001	T4-160920-1735-S3	ASTM D4282-02	KCE	1	PASI-E
		EPA 200.7	AIS, RVK	8	PASI-O





#### **PROJECT NARRATIVE**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Method: ASTM D4282-02
Description: Cyanide, Free

Client: Golder\_Dominion\_Bremo
Date: September 26, 2016

#### **General Information:**

1 sample was analyzed for ASTM D4282-02. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

(704)875-9092



#### **PROJECT NARRATIVE**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Method: EPA 200.7
Description: 200.7 MET ICP

Client: Golder\_Dominion\_Bremo
Date: September 26, 2016

#### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

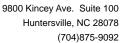
All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.





# **ANALYTICAL RESULTS**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Date: 09/26/2016 11:40 AM

Sample: T4-160920-1735-S3	Lab ID: 923	13181001	Collected: 09/20/1	6 17:35	Received: 09	9/21/16 13:30	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Cyanide, Free	Analytical Meth	od: ASTM	D4282-02					
Cyanide, Free	ND	mg/L	0.050	1		09/22/16 10:15	5 57-12-5	
200.7 MET ICP	Analytical Meth	od: EPA 20	00.7 Preparation Met	hod: El	PA 200.7			
Aluminum	ND	ug/L	100	1	09/22/16 12:50	09/22/16 16:43	3 7429-90-5	
Barium	283	ug/L	10.0	1	09/22/16 12:50	09/22/16 16:43	3 7440-39-3	
Beryllium	ND	ug/L	1.0	1	09/22/16 12:50	09/22/16 16:43	3 7440-41-7	
Boron	2260	ug/L	50.0	1	09/22/16 12:50	09/22/16 16:43	3 7440-42-8	
Cobalt	ND	ug/L	10.0	1	09/22/16 12:50	09/22/16 16:43	3 7440-48-4	
Iron	ND	ug/L	250	1	09/22/16 12:50	09/23/16 23:41	1 7439-89-6	
Molybdenum	180	ug/L	10.0	1	09/22/16 12:50	09/22/16 16:43	3 7439-98-7	
Vanadium	ND	ug/L	10.0	1	09/22/16 12:50	09/23/16 23:41	1 7440-62-2	



#### **QUALITY CONTROL DATA**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Date: 09/26/2016 11:40 AM

QC Batch: 329876 Analysis Method: ASTM D4282-02

QC Batch Method: ASTM D4282-02 Analysis Description: ASTM D4282 Free Cyanide

Associated Lab Samples: 92313181001

METHOD BLANK: 1827925 Matrix: Water

Associated Lab Samples: 92313181001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Cyanide, Free mg/L ND 0.050 09/22/16 10:15

LABORATORY CONTROL SAMPLE: 1827926

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Cyanide, Free mg/L 0.10 100 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1827927 1827928

MS MSD 92313181001 Spike Spike MS MSD MS MSD % Rec Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD Qual Cyanide, Free ND 90-110 mg/L .1 .1 0.10 0.10 93 94 0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL DATA**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Date: 09/26/2016 11:40 AM

QC Batch: 322085 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 MET

Associated Lab Samples: 92313181001

METHOD BLANK: 1714580 Matrix: Water

Associated Lab Samples: 92313181001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	09/22/16 16:55	
Barium	ug/L	ND	10.0	09/22/16 16:55	
Beryllium	ug/L	ND	1.0	09/22/16 16:55	
Boron	ug/L	ND	50.0	09/22/16 16:55	
Cobalt	ug/L	ND	10.0	09/22/16 16:55	
Iron	ug/L	ND	250	09/23/16 23:25	
Molybdenum	ug/L	ND	10.0	09/22/16 16:55	
Vanadium	ug/L	ND	10.0	09/23/16 23:25	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Aluminum	ug/L	2500	2660	106	85-115	
Barium	ug/L	250	256	102	85-115	
Beryllium	ug/L	25	26.9	108	85-115	
Boron	ug/L	2500	2570	103	85-115	
Cobalt	ug/L	250	257	103	85-115	
ron	ug/L	2500	2680	107	85-115	
Molybdenum	ug/L	250	246	98	85-115	
Vanadium Vanadium	ug/L	250	238	95	85-115	

MATRIX SPIKE & MATRIX SPI	KE DUPLICAT	E: 17145	82		1714583						
			MS	MSD							
	923	313186001	Spike	Spike	MS	MSD	MS	MSD	% Rec		
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	Qual
Aluminum	ug/L	ND	2500	2500	2560	2650	101	105	70-130	3	
Barium	ug/L	280	250	250	533	549	101	107	70-130	3	
Beryllium	ug/L	ND	25	25	26.8	26.9	107	107	70-130	0	
Boron	ug/L	2110	2500	2500	4840	4900	109	112	70-130	1	
Cobalt	ug/L	ND	250	250	251	256	100	102	70-130	2	
Iron	ug/L	ND	2500	2500	2660	2730	105	108	70-130	3	
Molybdenum	ug/L	181	250	250	423	435	97	102	70-130	3	
Vanadium	ug/L	ND	250	250	244	246	97	98	70-130	1	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: Bremo Monthly Process

Pace Project No.: 92313181

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

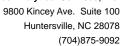
TNI - The NELAC Institute.

# **LABORATORIES**

Date: 09/26/2016 11:40 AM

PASI-E Pace Analytical Services - Eden

PASI-O Pace Analytical Services - Ormond Beach





# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: Bremo Monthly Process

Pace Project No.: 92313181

Date: 09/26/2016 11:40 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92313181001	T4-160920-1735-S3	ASTM D4282-02	329876		
92313181001	T4-160920-1735-S3	EPA 200.7	322085	EPA 200.7	322135



Out of hold, incorrect preservative, out of temp, incorrect containers)

# Document Name:

Sample Condition Upon Receipt(SCUR)

Document No.:
F-MEC-CS-009-Rev.03

Document Revised: May 24, 2016 Page 1 of 2

Issuing Authority:

Pace Mechanicsville Quality Office

Courier: Fed Ex UPS Commercial Ves No Seal	BYLYY    USI    Oti	PS ner:		WO#: 92313181  Project #:
Packing Material: Bubble Wrap Bu	bble Bags	₫n	one	Date/Initials Person Examining Contents: $9 - 2 - 16$ Other:
Thermometer:	poic paga		Wet	□Other: Samples on ice, cooling process has begun
Correction Factor: 0.0°C Cooler Temp Corrected (°C Temp should be above freezing to 6°C USDA Regulated Soil ( \square N/A, water sample)  Did samples originate in a quarantine zone within the United Yes \square No		3.6		Biological Tissue Frozen? Yes No N/A  maps)? Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No
				Comments/Discrepancy:
Chain of Custody Present?	Yes	□No	□N/A	1.
Samples Arrived within Hold Time?	Yes	No	□N/A	2.
Short Hold Time Analysis (<72 hr.)?	Yes	No	□n/a	3.
Rush Turn Around Time Requested?	Yes	□No	□n/a	4.
Sufficient Volume?	Yes	□No	□n/a	5.
Correct Containers Used?	Yes	□No	□n/a	6.
-Pace Containers Used?	Yes	□No	□N/A	_
Containers Intact?	Yes	□No	□n/A	7.
Samples Field Filtered?	Yes	□No	M/A N/A	8. Note if sediment is visible in the dissolved container
Sample Labels Match COC?  -Includes Date/Time/ID/Analysis Matrix:	Yes	□No	□n/a	9.
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in	Yes	□No	□n/a	10. <sub>HNG pH&lt;2</sub>
compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCI<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	Yes	□No	□n/a	H2SO4 pH<2
Exceptions: VOA, Coliform, TOC, Oil and Grease,	80 T/S	2 <del>3 - 13</del> 50		NaOH ptb-12 NaOH/ZnOAc ptb-9
DRO/8015 (water) DOC,LLHg	Yes	□No	N/A	
Samples checked for dechlorination?  Headspace in VOA Vials (>5-6mm)?	∐Yes	□No	MN/A	11.
Trip Blank Present?	Yes Yes	□No □No	N/A N/A	13.
Trip Blank Custody Seals Present?	Yes	□No	N/A	
Pace Trip Blank Lot # (if purchased):			24.17.1	
CLIENT NOTIFICATION/RESOLUTION				Field Data Required? ☐ Yes ☐ No
Person Contacted:  Comments/Sample Discrepancy:				Date/Time:
Project Manager SCURF Review:		NG		Date: 9/22/16
Project Manager SRF Review:  Note: Whenever there is a discrepancy affecting North Carolin	,	) M (7 e sample	s, a copy c	Date: 9(22/1)/ of this form will be sent to the North Carolina DEHNR Certification Office (i.e.

ace Analy ical

# CHAIN-OF-CUS The Chain-of-Gustody is a LEG.

NY / Analytical Request Document COUNTENT. All relevant fields must be completed incurrately

ADDITIONAL COMMENTS  RELINQUISITION DATE TIME SAMPLE CONDITIONS  THE PRODUCTION CONTROL OF THE CONDITIONS  THE CONDITIONS  THE PRODUCTION CONTROL OF THE CONTROL OF THE CONDITIONS  THE PRODUCTION CONTROL OF THE CONTROL O
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בטעה אם נו שני ייישנע כן ווא ש